REMARKS

This paper is responsive to the Office Action mailed from the Patent and Trademark Office on January 12, 2005, which has a shortened statutory period set to expire April 12, 2005. A one-month extension, extending the period of response to May 12, 2005, is requested in a petition filed herewith.

Claims 1-20 are pending in the above-identified application. Claims 1, 2 and 4-20 are rejected under 35 USC 102 and/or 35 USC 103 for the reasons set forth below.

In the current paper, Claims 1 and 3 are amended, Claims 10-17 are canceled, and Claims 21-24 are newly entered. No new matter is entered. In view of these amendments and the following remarks, Applicants respectfully request reconsideration and withdrawal of all pending claims.

Rejections Under 35 USC 102

Rejections over Yohn

Claims 1, 2, 4 and 8 are rejected under 35 USC 102(b) as being anticipated by Yohn (U.S. Patent No. 5,482,474).

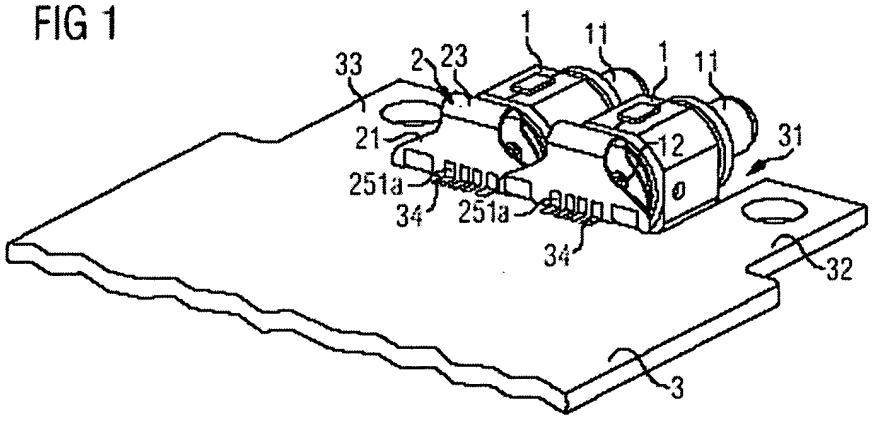
Claim 1 is amended to recite (in pertinent part):

> ...a printed circuit board with electrical contacts that are formed on a surface of the printed circuit board and extend toward an end face of the printed circuit board, and an at least partly flexible conductor support with a plurality of interconnects, the conductor support providing an electrical connection between the terminal contacts of the optoelectronic component and the electrical contacts of the printed circuit board,
>
> wherein a portion of the conductor support extends next to and adjacent to the end face of the printed circuit board and extends perpendicularly in relation to the surface of the printed circuit board, and wherein said portion is connected to the electrical contacts of the printed circuit board.

Support for the above-quoted amendment to Claim 1 is provided in Fig. 1 (reproduced below for reference), where electrical contacts 34 are formed on a surface of printed circuit board 3 and extend toward the end face (i.e., the edge extending between the upper and lower surfaces of printed circuit board 3), and make contact with contacts 251a of the flexible conductor support 2. Further, as clearly shown in Fig. 1, portion 21 of conductor support 2 runs next to and adjacent to the end face of the printed cicuit board and extends perpendicular to the upper/lower surfaces of the printed circuit board, where portion 21 is connected by way of contacts 251a to electrical contacts 34 of the printed circuit board. Support is also provided in paragraph 0018 (page 7 of Applicants specification), which states:

> In a development of this configuration, it is provided that the first portion of the conductor support has two rows of first contact regions. The contact regions of the first row are connected to electrical contacts on the one surface of the printed circuit board and the contact regions of the second row are connected to electrical contacts on the other surface of the printed circuit board. This allows the required space on the printed circuit board to be kept small in spite of a high number of contacts.

FIG 1



As amended, Claim 1 is distinguished over Yohn because Yohn fails to teach or suggest a portion of the sandwich connector 4

that extends next to and adjacent to the end face of the printed circuit board 3, extends perpendicularly in relation to the surface of the printed circuit board, and is connected to electrical contacts formed on the printed circuit board 3. Instead, Yohn's Fig. 1 clearly shows that sandwich connector 4 includes an upper connector 1 and a lower connector 2, where upper connector 1 is connected by way of fasteners 14 which extend through holes 18 formed in PCB 3 and couple to recesses 15 formed on lower connector 2. Further, Yohn's Fig. 1 clearly shows contact members 6 that extend through connectors 1 and 2, with each member 6 having a surface mount lead 8 and a butting surface 10 at its opposite ends, with leads 8 used for coupling to an associated contact 11, 12 on surfaces 22,23 of PCB 3.

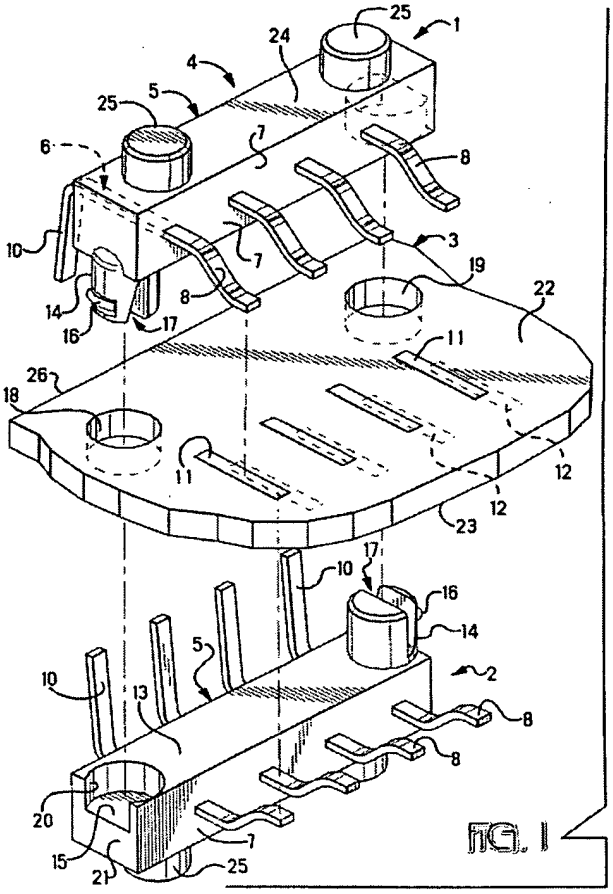


FIG. 1

4

With reference to FIG. 1 a top electrical connector 1 and a bottom electrical connector 2 sandwiches a printed circuit board 3 there between, and will form the board-to-board sandwich connector 4 of the present invention. Both the top and bottom electrical connectors 1, 2 are substantially identical and are simply properly oriented for mating to their respective surfaces of the printed circuit board 3.

5

Each connector 1, 2 has an elongated main body portion Each connector 1, 2 has an elongated main body portion 5 having a plurality of conductive leads or contact members 6 molded therein. Each contact member 6 projects from the front surface 7 of the elongated main body portion 5 as a surface mount lead 8, and from the rear surface 9 as a butting contact section 10.

The surface mount leads 8 will be soldered to top and bottom pads 11, 12 on the PCB 3. The surface mount leads 8 are resilient and will accommodate any unevenness of the surface of the PCB 3 which might be brought about by, for example, warping of the printed circuit board. The butting contact sections 10 angularly project from the rear surface 9 of the elongated main body 5 of both the top and bottom connectors 1, 2 shown in greater detail in FIG. 9. The butting contact sections 10 in ultimate use will butt and make contact with mating contacts of an electronic device (not shown).

Further, Yohn's Figs. 7 and 8 clearly show surface mount leads 8 that are connected to pads formed on upper surface 22 and lower

surface 23 of PCB 3, and that sandwich conductor 4 is remote from the end face of PCB 3. It is noted that the substantially vertical portions of Yohn's butting contacts 10 that extend next

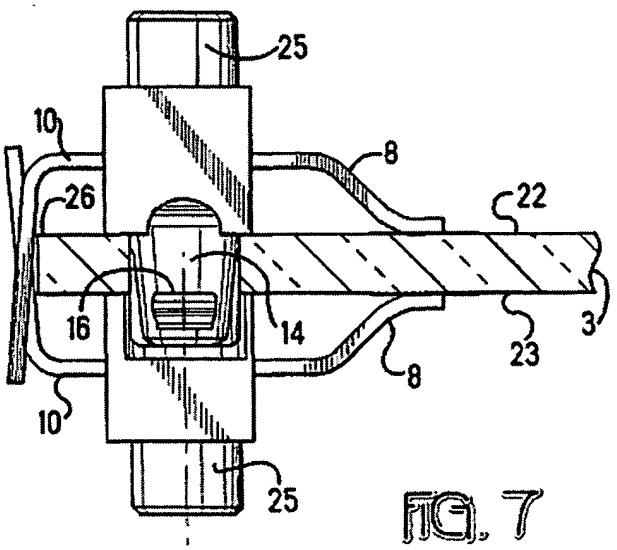


FIG. 7

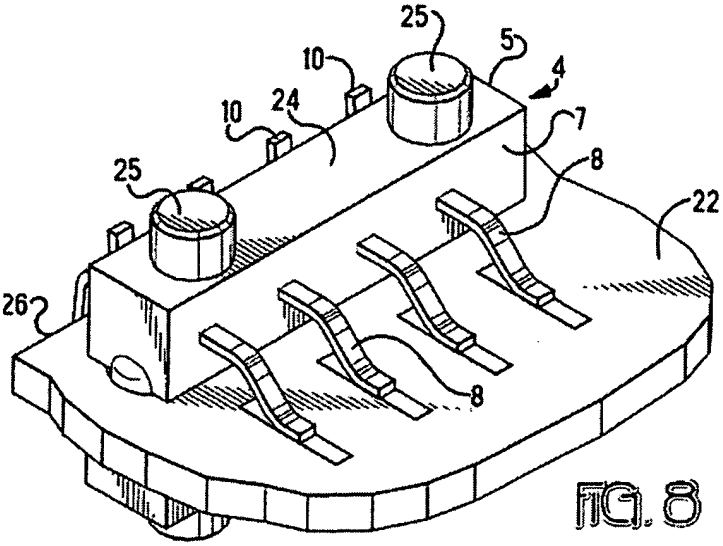


FIG. 8

to the end face of PCB 3 are not connected to electrical contacts formed at the end face of PCB 3, but are instead provided for connection to "an electronic device (not shown)" (see Column 5, lines 13-16, reproduced above). Thus, amended Claim 1 is clearly distinguished over Yohn at least because Yohn does not disclose "wherein a portion of the conductor support extends next to and adjacent to the end face of the printed circuit board and extends perpendicularly in relation to the surface of the printed circuit board, and wherein said portion is connected to the electrical contacts of the printed circuit board", as recited in Claim 1. Further, it would not have been obvious to solder butting contact sections 10 to contact pads formed on PCB 3 because, as clearly shown in Fig. 1, butting contacts 10 are extensions of contact members 6, which are already connected to pads 11,12 by way of surface mount leads 8 (i.e., if butting contacts 10 were connected to PcB 3, then sandwich connector 4 would serve no practical purpose.

Claims 2, 4 and 8 are dependent from Claim 1, and are therefore distinguished over Yohn for at least the reasons provided above with reference to Claim 1.

Rejections over Perino

Claims 1, 4-8 and 18-20 are rejected under 35 USC 102(b) as being anticipated by Perino et al (U.S. Patent No. 6,234,820).

Perino dislcoses a "mother" PCB 110 that includes a contact area 130, and a "daughter" PCB 150 that are connected by way of sockets 115 and latches 190 to "mother" PCB 110:

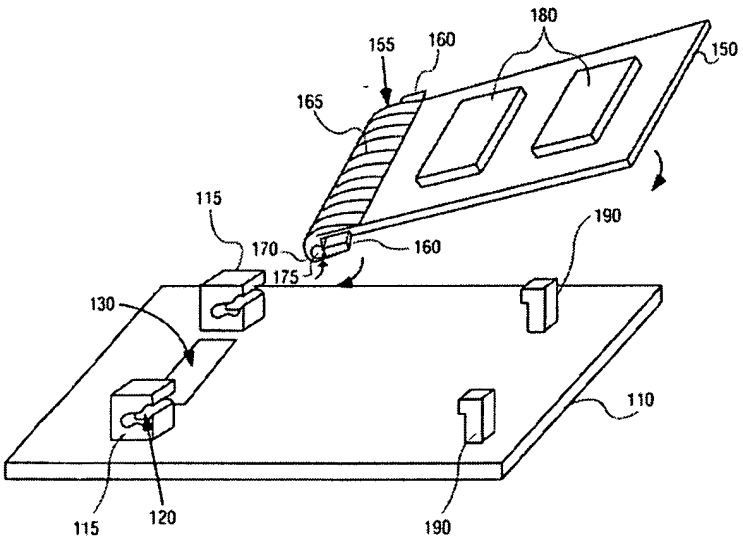


FIG. 1

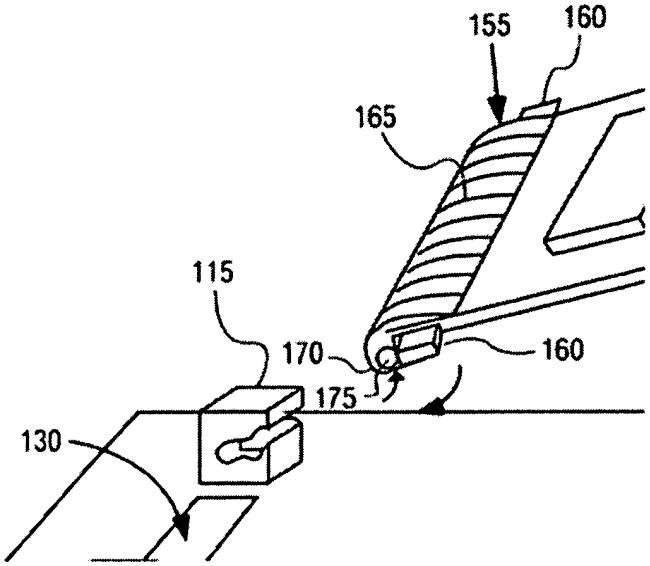
2

FIG. 1 is a perspective view of one embodiment of the present invention. The mother board **110** and daughter board **150** may be printed circuit boards having any type of functionality. For one embodiment, the mother board **110** includes dynamic random access memory (DRAM) and a DRAM controller, and the daughter board **150** includes additional DRAM modules.

Sockets **115** are coupled to the motherboard **110**. The sockets **115** may be part of two substantially parallel rails coupled to the motherboard **110**. Thus, a first rail may include the right socket **115**, while the second rail includes the left socket **115**. This allows a plurality of daughter boards to be attached to the mother board.

Two latches **190** are also coupled to the motherboard **110**. The latches **190** are to keep the daughter board **150** in place.

As described at the bottom of Perino's Column 2 and top of Column 3, electrical connection between mother board 110 and daughter board 150 is made by way of a connector 155, which includes signal leads 165 that wrap around an edge of the daughter board 150 (NOT mother board 110), and are connected by way of contact portions 175 to contact area 130 (which are indicated on a lower side of daughter board 150 in Fig. 1, of which the relevant portion is reproduced below):



2

The motherboard **110** further includes a plurality of traces (not shown) and a contact area **130**. The contact area is the

3

area to which the daughter board is electrically coupled.

A daughter board **150** is positioned to be coupled to the mother board **110**. The daughter board **150** may include a plurality of integrated circuits **180**. The daughter board includes a connector **155**. The connector **155** couples the daughter board **150** to the motherboard. The connector **155** includes two cam followers **160** on either side of the daughter board **150**. The cam followers **160** fit into the opening **120** of the sockets **115** on the motherboard **110**, to fix the daughter board **150** to the motherboard **110**. The connector **155** further includes signal leads **165**. The signal leads **165** are coupled to traces on the daughter board **150** (not shown). The signal leads **165** are wrapped around the edge of the daughter board **150**, and make contact with the contact area **130** of the motherboard **110** when the two boards are coupled. The signal leads **165** have a contact portion **175**, which touches the contact area **130** of the mother board **110** when the daughter board **150** and mother board **110** are coupled together. An elastomer **170** is positioned underneath the contact portion **175** of the signal leads **165**. The elastomer **170** provides flexibility.

Perino's Fig. 4, which shows an embodiment of Perino's daughter board 150, clearly indicates that flex circuit 440 (which apparently serves the purpose of signal leads 165 of Fig. 1) is wrapped around the edge of daughter board 150, but is connected only at one end (indicated at arrow 450) to trace 410:

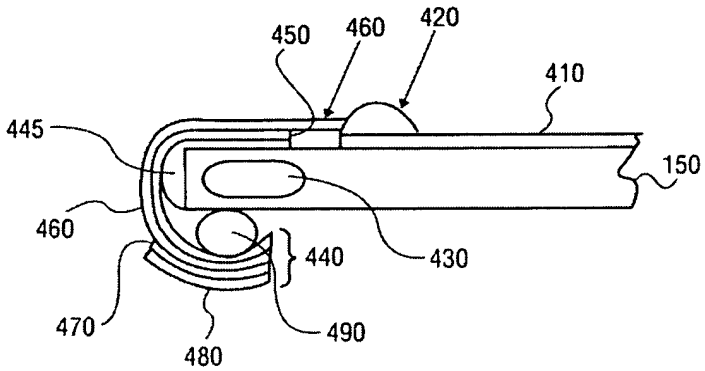


FIG. 4

5

FIG. 4 is an illustration of an alternative embodiment of the portion of the daughter board which makes contact with the motherboard. The daughter board **150** includes traces **410**. A cam follower **430** is attached on the side of the daughter board **150**. The cam follower **430** is to engage the socket of the mother board in order to secure the daughter board **150** to the mother board **110**.

A flex circuit **440** is attached to the daughter board **150** using an adhesive **445**, such as epoxy. The flex circuit **440** is for leading the traces **410** of the daughter board **150** to area of contact with the mother board **110**. Underneath the contact area of the flex circuit **440** an elastomer **490**. The elastomer is for providing flexibility to the signal traces of the flex circuit **440**. For one embodiment the elastomer is substantially cylindrical in shape. The portion of the flex circuit **440** over elastomer **490** includes layers **450**,**460**,**470** and **480**.

Claims 1 and 4-8

The amendment to Claim 1 is discussed above. As amended, Claim 1 is distinguished over Perino at least because Perino fails to teach or suggest a portion of the conductor 460 that (a)

extends next to and adjacent to the end face of board 150, (b) extends perpendicularly in relation to the surface of board 150, and (c) is connected to electrical contacts formed on the board 150. That is, Perino's Fig. 7 (reproduced above) clearly shows that the only portion of flexible conductor 460 that is connected to board 150 is at the end (i.e., indicated by arrow 450) connected to trace 410 on the upper surface of board 150, and this portion does not extend perpendicular to the end face of board 150 (i.e., it instead extends parallel to the upper surface of PCB 150). Therefore, Claim 1 is distinguished over Perino at least because Perino fails to teach "wherein a portion of the conductor support extends next to and adjacent to the end face of the printed circuit board and extends perpendicularly in relation to the surface of the printed circuit board, and wherein said portion is connected to the electrical contacts of the printed circuit board", as recited in Claim 1. Moreover, as set forth above with reference to Fig. 4, it would not have been obvious to connect the vertical portion of conductor 460 to board 150 at least because Perino clearly teaches the end face of board 150 is covered by an adhesive 445.

Claims 4-8 are dependent from Claim 1, and are therefore distinguished over Yohn for at least the reasons provided above with reference to Claim 1.

Claims 18-20

Similar to amended Claim 1, original Claim 18 recites (in pertinent part):

> ...an at least partially flexible conductor support including an elongated conductor having a first contact region connected to the electrical contact formed on the printed circuit board, and a second contact region connected to the terminal contact of the electronic component,
>
> wherein a first portion of the conductor support including the first contact region abuts the peripheral edge of the printed

circuit board and extends perpendicular to the upper and lower surfaces.

For reasons similar to those provided above with reference to Claim 1, Claim 18 is distinguished over Perino at least because Perino fails to teach or suggest a portion of the conductor 460 that (a) includes a contact region, (b) abuts the peripheral edge of board 150, and (c) extends perpendicular to the upper and lower surfaces of board 150. That is, Perino's Fig. 7 (reproduced above) clearly shows that the only portion of flexible conductor 460 that is connected to board 150 (indicated by arrow 450) is connected on the upper surface to trace 410, and this portion neither abuts the end face of board 150 nor extends perpendicular to the end face of board 150 (i.e., it instead extends parallel to the upper surface of PCB 150). Therefore, Claim 18 is distinguished over Perino at least because Perino fails to teach "wherein a first portion of the conductor support including the first contact region abuts the peripheral edge of the printed circuit board and extends perpendicular to the upper and lower surfaces", as recited in Claim 18. Moreover, as set forth above with reference to Fig. 4, it would not have been obvious to connect the vertical portion of conductor 460 to board 150 at least because Perino clearly teaches the end face of board 150 is covered by an adhesive 445.

Claims 19 and 20 are dependent from Claim 18, and are therefore distinguished over Perino for at least the reasons provided above with reference to Claim 18.

Rejections over Ibaraki

Claims 10-15 are rejected under 35 USC 102(b) as being anticipated by Ibaraki et al (U.S. Patent No. 5,681,176).

Claims 10-15 are canceled, thereby obviating the rejections directed to these claims.

For the above reasons, Applicants' respectfully request reconsideration and withdrawal of the rejections under 35 USC 102.

Rejections Under 35 USC 103

Claim 9 is rejected under 35 USC 103(a) as being unpatentable over Yohn.

Rejections over Yohn

Claim 9 is dependent from Claim 1, and are therefore distinguished over Yohn for at least the reasons provided above with reference to Claim 1.

Rejections over Ibaraki

Claims 10-13, 16 and 17 are rejected under 35 USC 103(a) as being unpatentable over admitted prior art in view of Ibaraki.

Claims 10-13, 16 and 17 are canceled, thereby obviating the rejections directed to these claims.

For the above reasons, Applicants' respectfully request reconsideration and withdrawal of the rejections under 35 USC 103.

Allowable Subject Matter

Claim 3 is indicated as being allowable if amended to incorporate the subject matter of Claim 1 (as filed). Claim 3 is amended herein in this respect, and is therefore believed to be in condition for allowance.

New Claims

Claims 21-24 22 are newly entered.

Claim 21 is dependent from Claim 1, and recites:

...wherein the electrical contacts formed on the printed circuit board include a

> first electrical contact formed on a surface of the printed circuit board at an end of the end face, and
>
> wherein the portion of the conductor support is connected to the electrical contact by way of a solder structure.

Support for the structure recited in Claim 21 is provided for example, in the last sentence of paragraph 0017 (page 7, "Consequently, contacting with respect to the contact regions of the flexible conductor support arranged on the end face can take place by means of **a solder** in the edge region"), and also in paragraph 0047.

Claim 21 is distinguished over the cited prior art at least by way of its dependence from Claim 1.

Claim 22 also depends from Claim 1, and recites:

> ...wherein the electrical contacts formed on the printed circuit board include a first electrical contact formed on a first surface of the printed circuit board at a first end of the end face, and a second electrical contact formed on a second surface of the printed circuit board at a second end of the end face, and
>
> wherein the portion of the conductor support is connected to both the first and second electrical contacts by way of first and second solder structures, respectively.

Support for and the benefit of the solder structures recited in Claim 22 is provided in paragraphs 0048 and 0049 of Applicants' specification:

> **[0048]** It is preferably provided that, in the same way as the contact regions 251a of the first row 25a of contact pads were connected to associated electrical contacts 34 on the one, upper side of the printed circuit board, the contact regions 251b arranged in a second row 25b are connected to assigned electrical contacts on the underside of the printed circuit board 23. The electrical connection between contacts 34 of the printed circuit board 3 and contacts of the flexible conductor 2 consequently also takes place mirror-symmetrically on the

> underside of the printed circuit board 3. This provides a particularly preferred configuration, since, in spite of the doubling of the terminal contacts, there is no additional space requirement on the printed circuit board 3. Consequently, a multiplicity of electrical connections between the flexible conductor 2 and the printed circuit board 3 can be provided in a very effective way.
>
> **[0049]** A further advantage of this configuration is that a very secure mechanical connection between the flexible conductor and the printed circuit board is provided by the soldering alone: by solderings on both edges of the printed circuit board, the cross section that is subjected to loading is enlarged to the thickness of the printed circuit board. The good mechanical strength may make it possible to dispense with separate adhesive bonding.

Claim 22 is distinguished over the cited prior art at least by way of its dependence from Claim 1. Claim 22 is further distinguished over the cited prior art in that none of the cited references teach or suggest "wherein the portion of the conductor support is connected to both the first and second electrical contacts by way of first and second solder structures, respectively" as recited in Claim 22.

Claim 23 depends from Claim 18 and, similar to Claim 21, recites:

> ...wherein the electrical contacts formed on the printed circuit board include a first electrical contact formed on a surface of the printed circuit board at an end of the end face, and
>
> wherein the portion of the conductor support is connected to the electrical contact by way of a solder structure.

Support for the structure recited in Claim 23 is the same as that provided above with reference to Claim 21, and Claim 23 is distinguished over the cited prior art at least by way of its dependence from Claim 18.

Claim 24 also depends from Claim 18 and, similar to Claim 22, recites:

> ...wherein the electrical contacts formed on the printed circuit board include a first electrical contact formed on the upper surface of the printed circuit board, and a second electrical contact formed on the lower surface of the printed circuit board, and
> wherein the first portion of the conductor support is connected to both the first and second electrical contacts by way of first and second solder structures, respectively.

Support for and the benefit of the structure recited in Claim 24 is the same as that provided above with reference to Claim 22.

Claim 24 is distinguished over the cited prior art at least by way of its dependence from Claim 18. Claim 24 is further distignuished over the cited prior art in that none of the cited references teach or suggest "wherein the first portion of the conductor support is connected to both the first and second electrical contacts by way of first and second solder structures, respectively" as recited in Claim 24.

CONCLUSION

Claims 1-9 and 18-24 are pending, and Applicants believes Claims 1-9 and 18-24 are in condition for allowance for the reasons stated above. Should the Examiner have any questions regarding the present paper, the Examiner is invited to contact the undersigned attorney at the number provided below.

Respectfully submitted,

Customer no.: 022888

Patrick T. Bever
Agent for Applicant
Reg. No. 33,834
408-451-5902

I hereby certify that this correspondence is being deposited with the United States Postal Service as FIRST CLASS MAIL in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450, on May 11, 2005.

Date: 5/11/2005 Signature: Rebecca A. Baumann